APPENDIX IV

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Summary of Van Design Information for UNOLS FIC
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INTRODUCTION

Scientists have been using vans for years to work at sea. There are a multitude of reasons why vans are valuable to sea-going scientists, with economy, efficiency, security, and compactness being just a few. The oceanographic community is committed to using vans at sea. This paper provides an overview of van design considerations for those desiring to develop this facility for their own use. As with ships, no one design can satisfy all requirements. Similarly, some designs have proven more successful than others. This paper is not intended to design 'a' van but to review van designs, illuminating their pros and cons.

Vans used for individual ships can afford to be designed with specialized equipment and tailored for that ship. Vans that are intended for world-ranging ships or the international community need to have a more generic design. As with ships, design features tend to be compromises between cost and sophistication. Simple, inexpensive designs may well suffice for single-purpose vans planned for single ship use. Significantly more thought and planning is necessary to design multi-purpose or multiple ship use vans, with international use demanding the most severe design considerations. As sophistication and versatility increase, so will cost. What follows is a summary of features available in van design. Pros and cons are discussed where appropriate. This information is intended to review existing van design and to guide future van construction.

1. Overall design.

A 20' length is the industry design standard and may facilitate shipping of the van. This size may be too large for use on the intermediate size class vessels. Some vessels have an 01 deck overhang which necessitates use of a 7' high van rather than the more standard 8' - 9'.

No one likes the idea of stacking vans while they are in use, but stackability for shipping to distant ports should be considered. Thus the frame should be of strong steel and the top should be reinforced. All exterior fittings should be recessed and there should be no exterior projections which could make the van awkward to stack or prone to damage during fork lifting, etc. Vans could be constructed with interior bolt-downs so that exterior mounted AC units could be secured and the van be made self-contained for shipping.

Fork lift slots in the van's bottom frame and lifting points for crane operation are important to allow loading options depending on port and facilities.

All construction materials, including hardware, windows, doors, plywood, paints, etc. should be marine grade. To reduce the possibility of standing in water or getting splashed by waves, exterior penetrations should be mounted as high as possible. Penetrations on the top will generally leak no matter what the sealing precautions.

A floor drain is essential. At the least, one should be able to hook up a length of hose so that material will drain over the side of the ship. It may be desirable to hook the drain to the ship's wastewater system. Depending on the proposed use of the van, the drain should have a shut-off valve and should drain to an isolated container (e.g. 55 gallon drum) for containment of hazardous materials.

2. Access/escape.

Doors for people: inward opening doors are not recommended They could lead to people being trapped in

the van or squashed behind the door by waves. Sliding doors (WT) were suggested but would surely be a maintenance issue over time.

Doors for loading/unloading: double doors for loading and unloading large pieces of equipment should be considered. These could close over an interior, demountable bulkhead. Power, water and other connections could come out through this bulkhead and thus would not protrude from the van during shipping.

Windows: a window or windows improves the working environment and could be seen as a safety feature (emergency lighting during day, view of the deck). Conversely, windows take up valuable interior bulkhead area. Perhaps a window in the door should be recommended as a minimum.

Escape hatches: more than one. Given the variety of configurations the van might end up in while on various ships, it seems like two wall hatches and one hatch on top might not be excessive, while bearing in mind the potential for top hatch leaks. Top escape hatches should be located at a corner so as not to compromise the strength of the van top.

Ladder: undoubtedly someone will want to use the space on top of the van and a ladder will be mounted. This should be detachable for shipping. It should not be mounted next to a window (someone climbing the ladder could fall through the window - I saw this happen) or over an escape hatch.

3. Heating/cooling/ventilation.

Active air replenishment is recommended and the incoming air may need to be filtered. Air-cooled heat pumps for heating and cooling may be more reliable and convenient than water-cooled pumps. Modern water-cooled pumps have, however, performed well for some. The desirability of water- versus air-cooled pumps may depend on the environment (e.g. polar, tropical) in which the van will be used.

Given that vans are unlikely to be stacked while in use, the AC unit could be mounted on the top, then unbolted for shipping with a patch placed over the spot where the AC unit would normally go. Again, leakage could be a problem. The bulkheads should be insulated.

4. Power.

An uninterruptible power supply is desirable but may be impractical to maintain for the van alone. There could be a dedicated circuit in the van for attachment to the ship's UPS system.

The primary power supply should be compatible with the UNOLS fleet. The consensus seems to be 480VAC 3 phase with outlets inside the van for stepping down to 220v 3 phase and perhaps 110v 1 phase. Strip outlets will add to the flexibility of interior layout. If the van is to be used on foreign research vessels flexibility as to voltages, frequencies, connectors and wiring conventions could be built in, significantly increasing van cost. In general the electrical system design should be carefully thought out and designed with built-in flexibility, i.e. the internal electrical system should be readily reconfigurable. This is probably not compatible with imbedding the system in the bulkheads. The van may need to provide for its own conditioned power. Both male and female external connections may need to be provided. Transformers, circuit breakers, distribution panels and adequate grounding need special consideration.

5. Other van - ship connections.

Water: there should be fresh and perhaps salt water hook-ups.

Communications: a link to the ship's communication system (phones, intercoms) and alarm system is recommended such that anyone working in the van can be contacted by ship's personnel and vice versa. An additional penetration for cables to data loggers, antennae, etc. may be useful.

Connection to gas and compressed air may be required.

6. Emergency.

Emergency lighting is desirable but, again, may be impractical to maintain. Several flashlights mounted in convenient locations were suggested by several to be a realistic solution. The van should be equipped with a smoke detector and fire extinguisher(s). Tony Thomas recommends a 'panic button' mounted near the door which will interrupt power to the van.

7. Internal Outfitting.

Unistrut fittings are a good thing. The van should be well-lit and easy to clean, suggesting use of linoleum and similar materials.